

RoHS Compliant 2X5 SC Small Form Factor Transceiver for Gigabit Ethernet



Description

The LC-1250xxxx series are high performance, cost effective optical transceivers intended for 1250Mb/s. They are designed to provide Gigabit Ethernet compliant link at 1250Mb/s for short, intermediate and long reach links, respectively.

The LC-1250xxxx series provide with the LC receptacle that are compatible with the industry standard LC connector.

The LC-1250xxxx series are Class 1 eye safety product. The optical power levels, under normal operation, are at eye safe level.

Features

- Compliant with SFF transceiver MSA specification
- Compliant with Specifications for IEEE 802.3z/Gigabit Ethernet
- LC-1250BxQxRx compliant with the 1.0625GBd Fiber Channel 100-SM-LC-L FC-PI Rev.13
- LC-1250AxFxRx compliant with the 1.0625GBd Fiber Channel FC-PI 100-M5-SN-I Rev.13
- Single +3.3V Power Supply
- PECL or TTL Signal Detect level
- Duplex LC connector interface
- Laser Class 1 Product which comply with the requirements of IEC 60825-1 and IEC 60825-2
- RoHS Compliant per Directive 2002/95/EC.

Applications

- Gigabit Ethernet/Fast Ethernet
- Switched backplane applications
- File server interface

Performance

LC-1250AxFxRx:

- 850nm VCSEL, up to 500m in 50/125 μ m MMF
- 850nm VCSEL, up to 220m in 62.5/125 μ m MMF

LC-1250BxQxRx:

- 1310nm FP laser, Data Link up to 10km in 9/125um SMF
- 1310nm FP laser, up to 550m in 50/125 μ m MMF
- 1310nm FP laser, up to 550m in 62.5/125 μ m MMF

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_S	-40		85	°C	
Lead Soldering Temperature	T_{SOLD}			260	°C	
Lead Soldering Time	t_{SOLD}			10	sec.	
Supply Voltage	V_{CC}	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Ambient Operating Temperature	T_A	0		70	°C	1
Supply Voltage	V_{CC}	3.135		3.465	V	

Note:

1. See ordering information for detail

Electrical Characteristics

($V_{CC} = 3.135$ to $3.465V$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Transmitter Data Input Voltage-Low	$V_{IL}-V_{CC}$	-1.810		-1.475	V	
Transmitter Data Input Voltage-High	$V_{IH}-V_{CC}$	-1.165		-0.880	V	
Transmitter Disable Input-High	V_{DISH}	2		V_{CC}	V	
Transmitter Disable Input-Low	V_{DISL}	0		0.8	V	
Receiver						
Data Output Voltage-Low	$V_{OL}-V_{CC}$	-1.95		-1.62	V	
Data Output Voltage-High	$V_{OH}-V_{CC}$	-1.045		-0.74	V	
PECL SD Output						
LOW level output voltage	$V_{SDL}-V_{CC}$	-1.95		-1.62	V	
HIGH level output voltage	$V_{SDH}-V_{CC}$	-1.05		-0.74	V	
TTL SD Output						
LOW level output voltage	V_{SDL}	0		0.8	V	
HIGH level output voltage	V_{SDH}	2		V_{CC}	V	

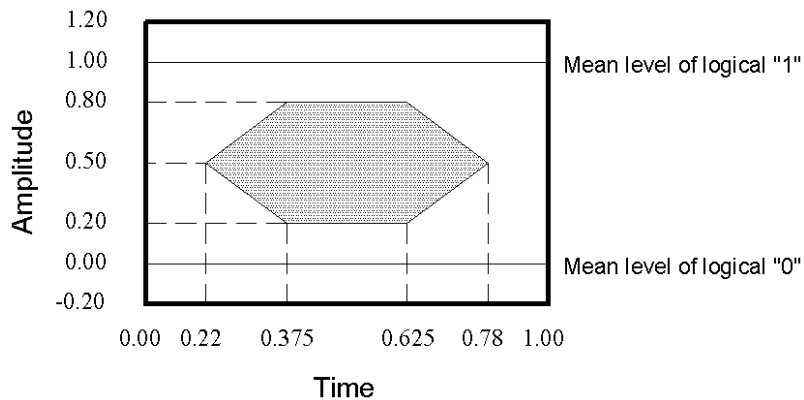
Optical Performance Specification

 ($V_{CC} = 3.135$ to $3.465V$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	I_{CC}			150	mA	
Output Optical Power (Avg.) LC-1250AxFxRx LC-1250BxQxRx	P_O	-9.5 -9.5		-4 -3	dBm	
Optical Extinction Ratio	ER	9			dB	
Center Wavelength LC-1250AxFxRx LC-1250BxQxRx	λ_c	830 1274		860 1355	nm	
Spectral Width (RMS) LC-1250AxFxRx LC-1250BxQxRx	σ			0.85 4.5	nm	
Optical Rise/Fall time LC-1250AxFxRx LC-1250BxQxRx	t_r/t_f			0.26 0.4	ns	1
Relative Intensity Noise	RIN			-116	dB/Hz	
Output Eye	Complies with the IEEE 802.3z/D2 specification, and is class 1 laser eye safety					
Receiver						
Supply Current	I_{CC}			120	mA	
Optical Input Sensitivity (Avg.) LC-1250AxFxRx LC-1250BxQxRx	P_{IN}			-17 -19	dBm	2
Optical Receiver saturation (Avg.)	P_{SAT}	-3			dBm	
Input Optical Wavelength LC-1250AxFxRx LC-1250BxQxRx	λ	830 1274		860 1355	nm	
Optical Rise/Fall time LC-1250AxFxRx LC-1250BxQxRx	t_r/t_f			0.36 0.5	ns	1
Signal Detect-Asserted (Avg.) LC-1250AxFxRx LC-1250BxQxRx	PA			-17 -19	dBm	
Signal Detect-De-asserted (Avg.)	PD	-30			dBm	
Signal Detect-Hysteresis	PA-PD	0.5			dB	

Notes:

1. These are unfiltered 20%~80% values
2. The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 1250Mb/s, 2^7-1 PRBS and ER=9dB.

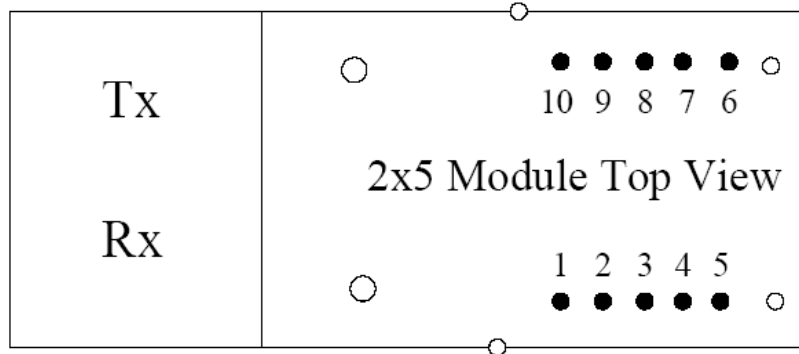


Mask of the eye diagram for the optical transmit signal

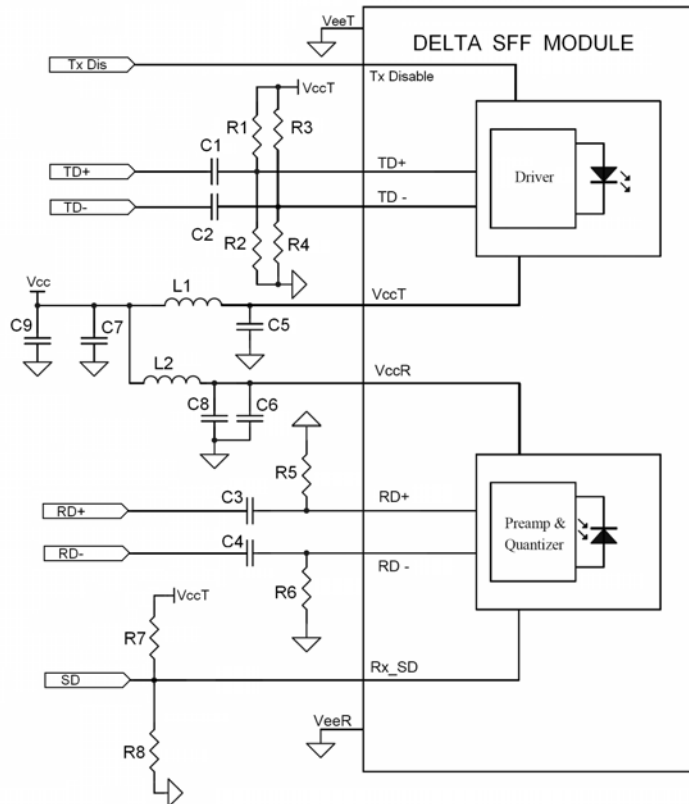
Pin Definition

PIN	Symbol	Functional description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL or LVTTTL)
4	RD(-)	Receiver Data Out Inverted (LVPECL)
5	RD(+)	Receiver Data Out Non-inverted (LVPECL)
6	VccT	Transmitter Power Supply
7	GND	Transmitter Signal Ground
8	TxDis	Transmitter Disable
9	TD (+)	Transmitter Data In Non-inverted (LVPECL)
10	TD (-)	Transmitter Data In Inverted (LVPECL)

Pin Out Drawing



Recommended Circuit Schematic (LC-1250xxx1Rx)

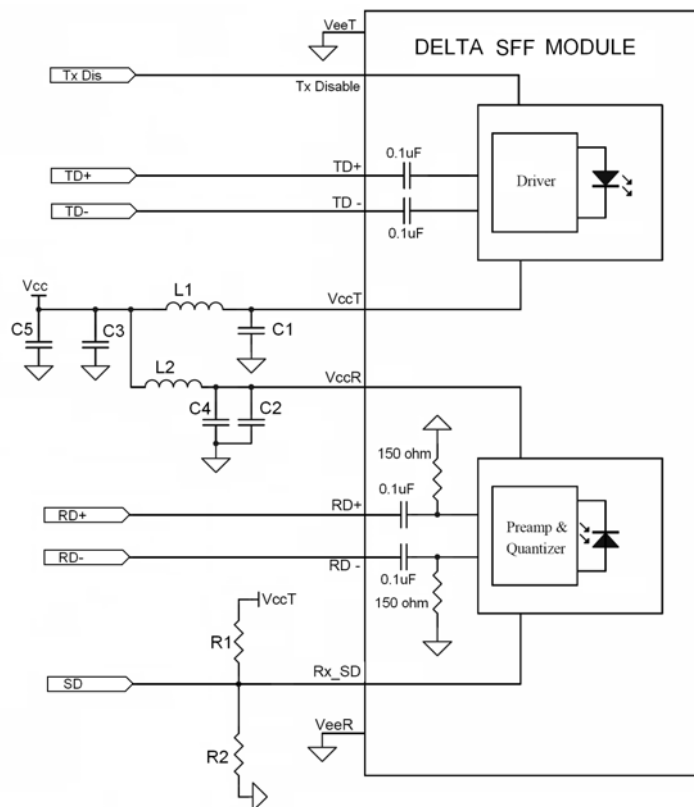


- R1=R3=82 ohm (3.3V),68 ohm(5V)
- R2=R4=130 ohm (3.3V),191 ohm (5V)
- R5=R6=150 ohm (3.3V),270 ohm (5V)
- R7=130 ohm (3.3V PECL),82 ohm(5V),NC (TTL)
- R8=82 ohm (3.3V PECL),130 ohm(5V),NC (TTL)
- C1=C2=C3=C4=C5=C6=C7=100 nF

C8=C9=10uF

L1=L2=1uH

Recommended Circuit Schematic (LC-1250xxx2Rx)



R1=130 ohm (3.3V PECL),82 ohm(5V),NC (TTL)

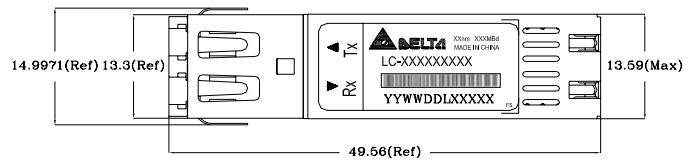
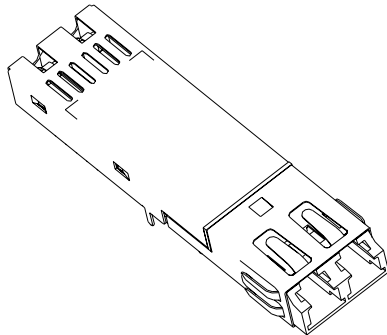
R2=82 ohm (3.3V PECL),130 ohm(5V),NC (TTL)

C1=C2=C3 =100 nF

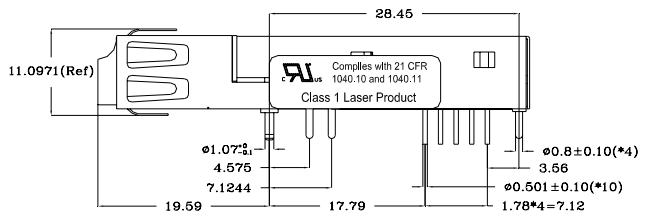
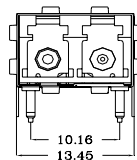
C4=C5=10uF

L1=L2=1uH

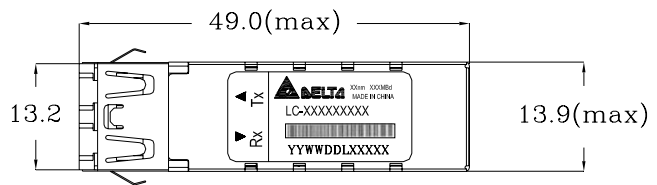
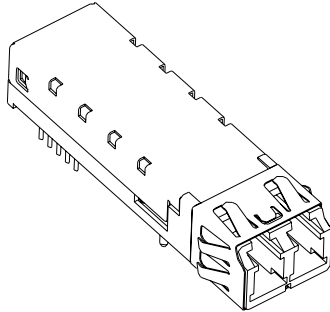
Package Outline (Plastic Housing)



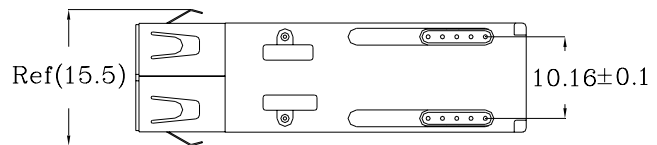
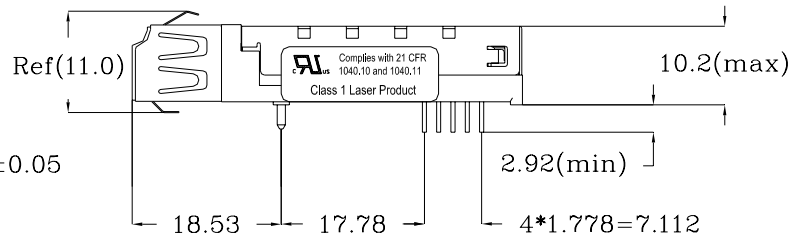
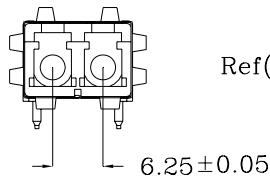
UNIT : mm
TOLERANCE : ±0.2



Package Outline (Metal Housing)



UNIT:mm
TOLERANCE: ±0.2



Regulatory Compliance

Feature	Reference	Performance
Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B (CISPR 22A)	(1) Satisfied with electrical characteristics of product spec. (2) No physical damage
Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	
Electrostatic Discharge to the Duplex LC Receptacle	EN 61000-4-2 IEC 1000-4-2 IEC 801.2	
Electrostatic Discharge to the Electrical Pins	MIL-STD-883E Method 3015.7	
Eye Safety	US FDA CDRH AEL Class 1 EN 60950: 2000 EN 60825-1: 1994+A11+A2 EN 60825-2: 2000	CDRH File # 0321539-00 TUV Certificate No. R50032471
Component Recognition	Underwriters Laboratories and Canadian Standards Association Joint Component Recognition for Information Technology Equipment Including Electrical Business Equipment	UL File # E239394



Order Information

LC- 1250X₁X₂X₃X₄X₅X₆X₇

X₁: Light source types

- A: Multi-mode 850nm
- B: Single-mode 1310nm

X₂: Power Supply Voltage and SD Level

- 2: 3.3V, PECL SD Level
- 4: 3.3V, TTL SD Level

X₃: Distance

- F: 500m, 50/125 μm MMF
- Q: 10km, 9/125 μm SMF

X₄: Data Coupling

- 1: SFF LC DC/DC
- 2: SFF LC AC/AC

X₅: RoHS Compliant

- Blank: Non-RoHS Compliant
- R: RoHS Compliant

X₆: Shielding Type & housing

- A: New design
- B: B type shielding
- C: C type shielding
- D: A type shielding
- M: Metal housing
- P: Plastic housing

X₇: Temperature

- Blank: 0 to +70 degree C
- H: -10 to + 85 degree C
- T: -40 to + 85 degree C

Appendix A. Document Revision

Version No.	Date	Description
0G	2006-11	Release
0H	2008-01	Correct "TTL SD Output", "PECL SD Output", Optical Rise/Fall time, Spectral Width (RMS), Package Outline, Circuit Schematic, Order Information